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EFFICIENT USE OF LOW-PRESSURE WATER ENERGY

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ABOUT ARTICLE

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Abstract: Specific laws and procedures have been introduced in each period for the purposeful use of water. In particular, in today's global warming period, the use of water as an energy source requires the use of more economical and modern automatic management techniques. The article discusses the devices and methods that allow efficient use of water energy. Undoubtedly, the most important place in the use of water energy is the importance of water tanks. Conventional water does not allow full and repeated use of the water flow in the pipe through the shovels. To use them, you need to use the active or reactive method. In these cases, it is necessary to turn the disc rotating blade submerged or exposed.

INTRODUCTION

Existing types of hydropower cannot be considered as an absolute source of eco-energy [6; 7].

Considering the complexity of building a high-capacity hydro-structure in the current water shortage situation, and taking into account the disruption to the water supply, it is possible to use the energy of the water flow more than once, even repeatedly, and reduce the evaporation of water into the air. the use of aggregates and devices that allow the use of water flow in any rivers, canals, ditches as an energy source is of great importance. The use of these devices guarantees that the hydropower system does not destroy or change the irrigation systems, and does not choose an optimal geographical location for the use of water dams and hydropower.

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There are the following ways to create pressure:

1. Nodal method or nodal scheme of HPP, in which pressure is created using a nodal;
2. Derivation method - HPP derivation scheme, in which the pressure is generated mainly due to derivation (channel, tunnel, etc.);
3. Mixed method - HPP mixed method scheme, in which the pressure is generated at the expense of the node and at the expense of derivation;
4. HPP in irrigation facilities using existing sprinklers.

The scheme of HPP with a dam is more acceptable for a large water consumption and a small slope of the water flow (river).

The pressure is created due to the construction of a dam and collection of water volume in the upper bef.

The disadvantage of the method of creating pressure with a dam is that it floods a large area of land, and the dam is expensive.

In the derivation scheme, pressure is generated using derivation. Derivation serves to create a concentrated pressure in a certain part of the river.

The farther the pressure pond is from the water intake facility, the greater the level difference between the derivation channel and the river. Using the derivation method, the energy of high-slope and low-flow, mountain and sub-mountain rivers is used.

METHOD AND MATERIALS

Traditionality and high efficiency of hydropower is an important aspect in energy.

So, what should be done for this? What is the structure of such an energy unit? In order to answer this question, we draw attention to some parameters.

$$\mathrm{N} = \frac{S \cdot \rho \cdot \vartheta^3}{2} \qquad (1)$$

Total power of water flow in N-pipe, S-pipe cross-sectional area, ρ-water density, ϑ-velocity.

$$\mathrm{S}_1 \cdot \vartheta_1 = \mathrm{S}_2 \cdot \vartheta_2 \qquad (2)$$

According to the continuity equation (2), the required speed can be obtained from the difference of the cross-sectional surfaces [2;3]. In general, liquids can have sufficient capacity due to free flow in closed pipes. But it allows the use of power only when the movement of water in closed pipes is transferred outside the pipe (1).

Undoubtedly, the most important place in the use of water energy is the importance of water tanks. Conventional water does not allow full and repeated use of the water flow in the pipe through the shovels. To use them, you need to use the active or reactive method. In these cases, it is necessary to turn the disc rotating blade submerged or exposed. In turn, it is necessary for the water to shoot out of the pipe through the nozzle and hit the blades of the parcher [1].

In order to generate more power or use water energy, it is necessary to collect water energy in one place with the help of derivation, which creates the concentration of water flow, that is, water pressure [8].

We define the height of the flow L and the speed H by ϑ.

$$L = \frac{H}{sin\alpha} \tag{3}$$

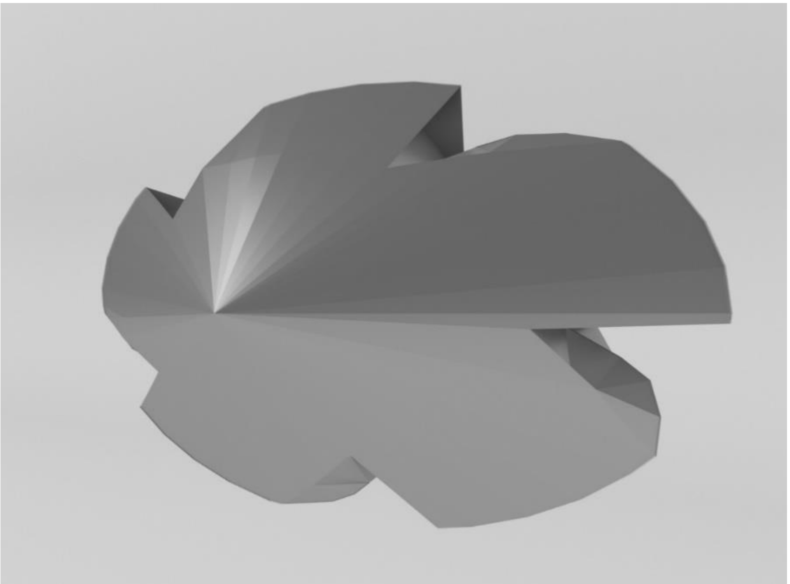
$$L = \vartheta \cdot t \tag{4}$$

Considering that it is based on the law of continuity, then

Obtained results and discussion: In order to use the internal flow power (1), the water vane should be such that it can circulate freely inside the flowing pipe, while the water flow transmits the pressure force to the external shaft, it is necessary that the "forehead" does not encounter resistance.

Accordingly, it is advisable to use a conical drum. That is, in such a drum hydroturbine there is no steam. Grooves made from the edges of the drum to the inner side of the drum serve as a flap.

As the drum rotates inside the pipe, it can simultaneously move along the flow and against it without disturbing the flow. Due to the fact that it easily overcomes the "frontal resistance" in the section of movement against the current, the rotating drum can perform the above tasks.



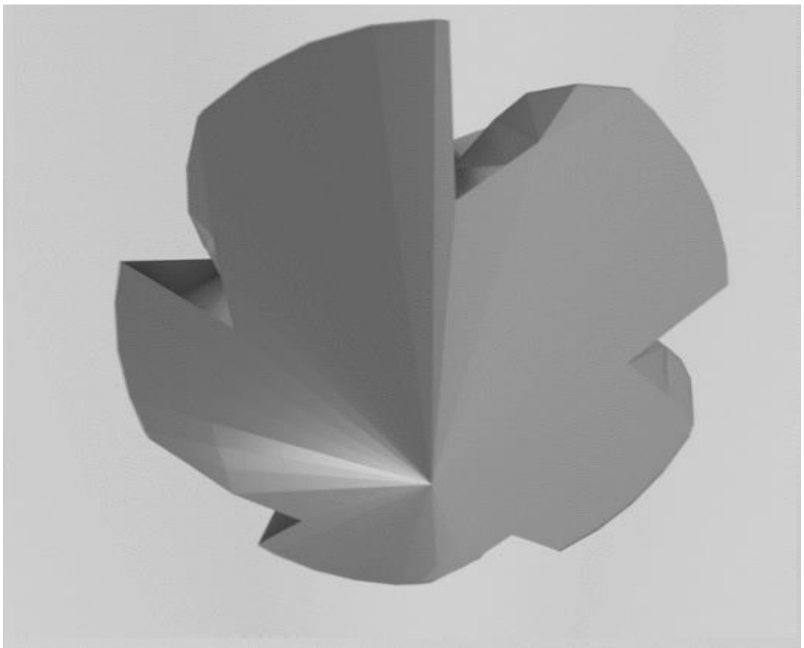


Figure 1. View of a drum moving perpendicular to the flow. The construction in Fig. 1 shows a drum that can rotate freely in the cross section of the water flow inside the pipe.

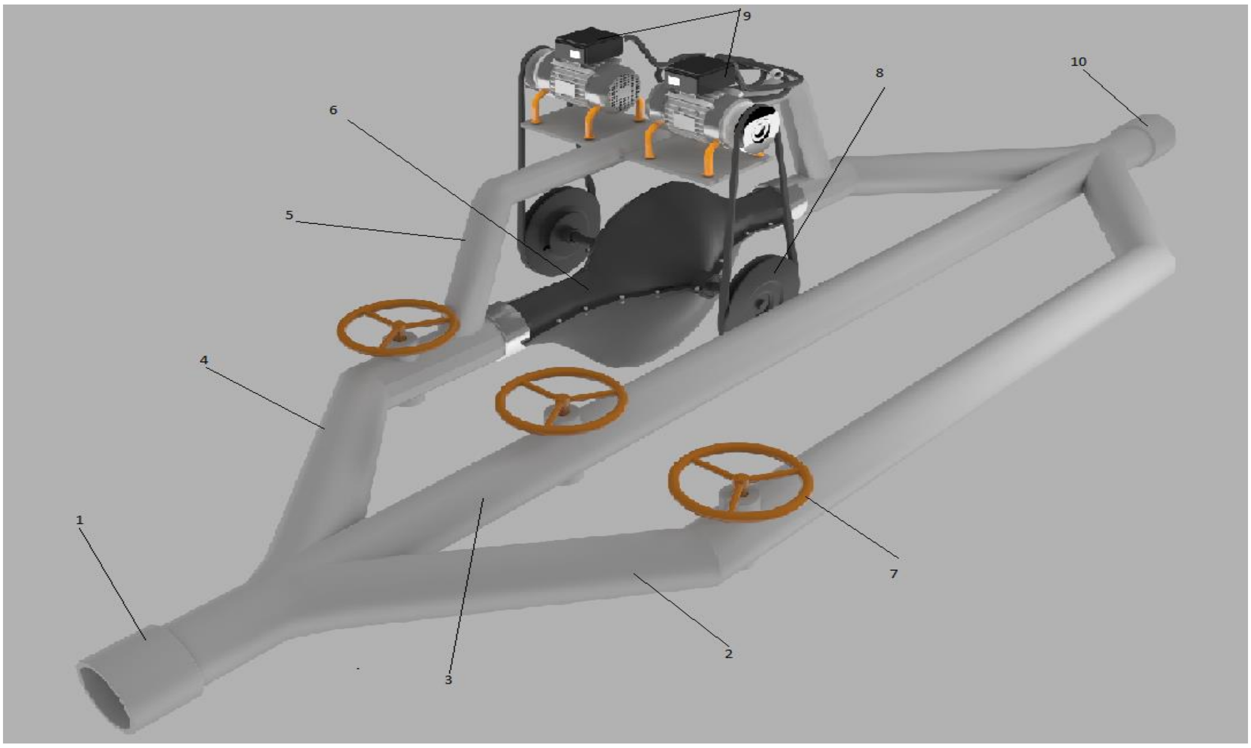


Figure 2. Hydro turbine for use of low pressure water energy

1-General supply pipeline. 2-Reserve block. 3-Verifying block.4th Parrak Block. 5-storage (throttle) pipe. 6 housing housing a rotating conical drum receiving water movement. 7 flow control vanes. Transmission (pulley) on the 8th rotary shaft. 9-asynchronous electric generators. 10-common drainage pipe.

In Figure 2, the upper part of the casing, where the rotating cone-shaped drum receiving water movement 6 is located, although the current is not strong, there is water at a total pressure. This can resist the backlash of the blades and create "frontal resistance" which resists the movement of the drum. But this resistance is reduced by sharp ridges in the upstream part of the drum (Fig. 2), which dramatically reduces the resistance created by the water during the reverse movement, ensuring that the drum can move smoothly against the current.

From the continuity equation (2), the water velocity in Block 4 Parrak can be obtained to the required amount. Accordingly, water pressure is also created. It should be able to pass freely in order to be able to rotate the low-power generators easily, and it should be able to rotate the hydro turbine generator located next (at a certain distance) at a sufficient speed. Capable of performing such tasks and operating in a closed system (conservative), able to move against high water pressure, able to accept high pressure water velocity, and at the same time (5) must overcome the resistance without difficulty.

$$F = \mathrm{k} \cdot \vartheta \qquad (5)$$

(F)-forehead resistance, k-resistance coefficient, ϑ -flow rate.

The edges of the rotating drum have five grooves (which act as spades). These grooves are made not from the center of the drum, but up to half of its radius. Such a location ensures high torque.

This drum rotates at 3600 perpendicular to the water flow. The driving force on the rotating shaft 8 fixed to the housing is transmitted to the outside through closed bearings (Fig. 2).

This hydro-turbine can also make it possible to use the energy of the water flow repeatedly, many times. For this purpose, a derivation is organized through the water flow pipe. During the serial connection of hydroturbines to the common pipeline, during the installation and individual repair of each of them, so that none of them interferes with the general flow movement, spare passageways are established in the common water line through the 2nd Reserve block. 4- After the parking block is in working condition, it opens and the spare lane is closed Fig. 2. In order to ensure the rotation of the generator at the same rate, it is planned to organize (Fig. 2. Throttle corridor 5) in this hydroturbine.

CONCLUSIONS AND SUGGESTIONS

The use of the above considerations in hydropower does not require water damming, a special geographical location, or the construction of a separate water facility. It also allows effective use of small streams, canals and rivers in hydropower without affecting irrigation systems.

In this hydroturbine, a self-retracting flow force occurs. This gravitational force causes the rotation of the drum to increase. This gravitational force is not only the upper pressure force against the rotating drum, but also the lower gravitational force. Harmful water shocks do not occur in such a hydro turbine [4;5].

The kinetic energy of water is estimated by the speed it takes. If the initial diameter in the series of pipes is 1000 mm. When the impact speed from the nozzle to the slotted shovel is considered in terms of potential and kinetic energy, and when the height difference is two meters per hundred meters, from formula (4), based on the Law of Continuity

$$A = \rho \cdot g \cdot S \cdot \vartheta \cdot t \cdot sin\alpha \cdot H \quad (6)$$

$\rho = 1000\frac{kg}{m^3}$, g=9,8 $\frac{\text{m}}{s^2}$, $S = 3{,}14m^2$, $\vartheta = 8\frac{m}{s}$, t=1c, $\alpha = 45^{\circ}$, H=2,5m.

Since the total work is A=1978200 Joules.

This work is done at one point. So, considering that there is one energy point in every hundred meters of the flow, the total energy is 19,782,000 joules in one line, at the expense of 10 points in every thousand meters. When the parallel lines form three, the total energy at this distance is 59,346,000 Joules per second. 47,476,800 Joules are net energy if 20% of the total energy is wasted.

It should be noted that this calculation is obtained in the smallest values compared to the values that can be made by the books.

Thus, if one of the above devices is installed every hundred meters (the current can recover its previous speed in the range of 50-100 meters due to the total pressure in the pipe), the sum of the small powers in the sources located at the corresponding points of each line constitutes a considerable amount of energy. takes Such networks are organized in parallel depending on the volume of flow.

This construction is significant due to the economic efficiency of using small water streams as an energy source in today's global ecological, water and energy shortage situation. The amount of energy was calculated on the basis of 24 hours of use of all consumption.

The following conveniences and possibilities are achieved from the hydro turbine as an energy source for the use of low-pressure water energy:

1. Creating the required pressure with the help of derivation in low-pressure water flow;
2. Due to the fact that the proposed hydro turbine is a closed system, it is possible to install it in the favorable land part of the geography of the place without the loss of flow;
3. Repeated use of flow energy in several stages;
4. Availability of separate use of each installed energy source, coverage of more consumers in energy supply;
5. The possibility of repair and correction of the hydro turbine located at each energy point without disturbing the movement of the main stream.

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